

09/612,260

1. (Currently Amended) A transistor comprising:
a channel region;
a first gate on top of said channel region;
a second gate below said channel region; and
source and drain regions laterally adjacent said channel region,
wherein said channel region includes an extension into said source and drain regions, and
wherein said first gate comprises the same material as said second gate, and has a
different doping concentration than said second gate.
2. (Canceled).
3. (Original) The transistor of claim 1, wherein said first gate comprises a different doping species than said second gate.
4. (Original) The transistor of claim 1, further comprising a first gate dielectric below said first gate and a second gate dielectric above said second gate.
5. (Currently Amended) ~~The transistor of claim 1,~~ A transistor comprising:
a channel region;
a first gate on top of said channel region;
a second gate below said channel region; and
source and drain regions laterally adjacent said channel region,
wherein said channel region includes an extension into said source and drain regions, and
wherein said first gate has a first conductive contact and said second gate has a second conductive contact and said first conductive contact and said second conductive contact are coplanar.
6. (Currently Amended) ~~The transistor of claim 1,~~ A transistor comprising:
a channel region;

09/612,260

a first gate on top of said channel region;
a second gate below said channel region; and
source and drain regions laterally adjacent said channel region,
wherein said channel region includes an extension into said source and drain regions, and
wherein said first gate comprises a different material than said second gate.

7. (Original) The transistor of claim 1, wherein said first gate comprises a different thickness than said second gate.

8. (Original) The transistor of claim 1, wherein said first gate, said second gate and said channel region form a planarized structure.

9. (Currently Amended) ~~The transistor of claim 4,~~ A transistor comprising:
a channel region;
a first gate on top of said channel region;
a second gate below said channel region;
source and drain regions laterally adjacent said channel region; and
a first gate dielectric below said first gate and a second gate dielectric above said second gate,
wherein said channel region includes an extension into said source and drain regions, and
wherein said first gate dielectric comprises a different material than said second gate dielectric.

10. (Currently Amended) ~~The transistor of claim 4,~~ A transistor comprising:
a channel region;
a first gate on top of said channel region;
a second gate below said channel region;
source and drain regions laterally adjacent said channel region; and
a first gate dielectric below said first gate and a second gate dielectric above said second gate,

09/612,260

wherein said channel region includes an extension into said source and drain regions, and

wherein said first gate dielectric comprises a different thickness than said second gate dielectric.

11. (Previously Presented) A semiconductor chip having at least one transistor, said transistor comprising:

a channel region;

a first gate on top of said channel region;

a second gate below said channel region;

a first gate dielectric below said first gate;

a second gate dielectric above said second gate;

source and drain regions laterally adjacent said channel region; and

source and drain dielectrics between said source and drain regions and said first gate and said second gate,

wherein a thickness and material selection of said first gate dielectric and said second gate dielectric is independent of said source and drain dielectrics.

12. (Original) The semiconductor chip of claim 11, wherein said first gate and said second gate have different dopant concentrations.

13. (Original) The semiconductor chip of claim 11, wherein said first gate and said second gate have different dopant species.

14. (Cancelled).

15. (Previously Presented) The semiconductor chip of claim 11, wherein said first gate dielectric comprises a different material than said second gate dielectric.

09/612,260

16. (Previously Presented) The semiconductor chip of claim 11, wherein said first gate dielectric comprises a different thickness than said second gate dielectric.

17. (Original) The semiconductor chip of claim 11, wherein said first gate has a first conductive contact and said second gate has a second conductive contact and said first conductive contact and said second conductive contact are coplanar.

18. (Original) The semiconductor chip of claim 11, wherein said first gate and said second gate are electrically separated.

19. (Original) The semiconductor chip of claim 11, wherein said first gate and said second gate have different thicknesses.

20. (Original) The semiconductor chip of claim 11, wherein said first gate, said second gate and said channel region form a planarized structure.

21-43. (Cancelled).

44. (Previously Presented) A transistor comprising:

a channel region;

a first gate on top of said channel region;

a second gate below said channel region;

an isolation layer below said second gate; and

source and drain regions laterally adjacent said channel region,

wherein said source and drain regions are self-aligned with said first gate and said second gate, such that said source and drain regions do not horizontally overlap said first gate or said second gate, and

wherein said first gate and said second gate are electrically separated from each other, and

09/612,260

wherein said channel region includes an extension into said source and drain regions.

45-54. (Cancelled).

55. (Currently Amended) A transistor comprising:

a substrate having a crystal orientation;

a single crystal channel above said substrate, wherein the crystal orientation of said single crystal channel is independent of said crystal orientation of said substrate;

a first gate above said single crystal channel; and

a second gate below said single crystal channel,

wherein said first gate comprises the same material as said second gate, and has a different doping concentration than said second gate.

56. (Canceled).

57. (Previously Presented) The transistor of claim 44, wherein said first gate comprises a different doping species than said second gate.

58. (Previously Presented) The transistor of claim 44, further comprising a first gate dielectric below said first gate and a second gate dielectric above said second gate.

59. (Previously Presented) The transistor of claim 44, wherein said first gate has a first conductive contact and said second gate has a second conductive contact and said first conductive contact and said second conductive contact are coplanar.

60. (Previously Presented) The transistor of claim 44, wherein said first gate comprises a different material than said second gate.

09/612,260

61. (Previously Presented) The transistor of claim 44, wherein said first gate comprises a different thickness than said second gate.

62. (Previously Presented) The transistor of claim 44, wherein said first gate, said second gate and said channel region form a planarized structure.

63. (Previously Presented) The transistor of claim 58, wherein said first gate dielectric comprises a different material than said second gate dielectric.

64. (Previously Presented) The transistor of claim 58, wherein said first gate dielectric comprises a different thickness than said second gate dielectric.

65. (Currently Amended) A transistor comprising:
a channel region;
a first gate on top of said channel region;
a second gate below said channel region;
an isolation layer below said second gate; and
source and drain regions laterally adjacent said channel region,
wherein said source and drain regions are self-aligned with said first gate and said second gate, such that said source and drain regions do not horizontally overlap said first gate or said second gate, and
wherein said first gate and said second gate are electrically separated from each other, and
wherein said first gate comprises the same material as said second gate, and has a
different doping concentration than said second gate.

66. (Canceled).

09/612,260

67. (Previously Presented) The transistor of claim 65, wherein said first gate comprises a different doping species than said second gate.
68. (Previously Presented) The transistor of claim 65, further comprising a first gate dielectric below said first gate and a second gate dielectric above said second gate.
69. (Previously Presented) The transistor of claim 65, wherein said first gate has a first conductive contact and said second gate has a second conductive contact and said first conductive contact and said second conductive contact are coplanar.
70. (Previously Presented) The transistor of claim 65, wherein said first gate comprises a different material than said second gate.
71. (Previously Presented) The transistor of claim 65, wherein said first gate comprises a different thickness than said second gate.
72. (Previously Presented) The transistor of claim 65, wherein said first gate, said second gate and said channel region form a planarized structure.
73. (Previously Presented) The transistor of claim 68, wherein said first gate dielectric comprises a different material than said second gate dielectric.
74. (Previously Presented) The transistor of claim 68, wherein said first gate dielectric comprises a different thickness than said second gate dielectric.